

# Covalent bonding

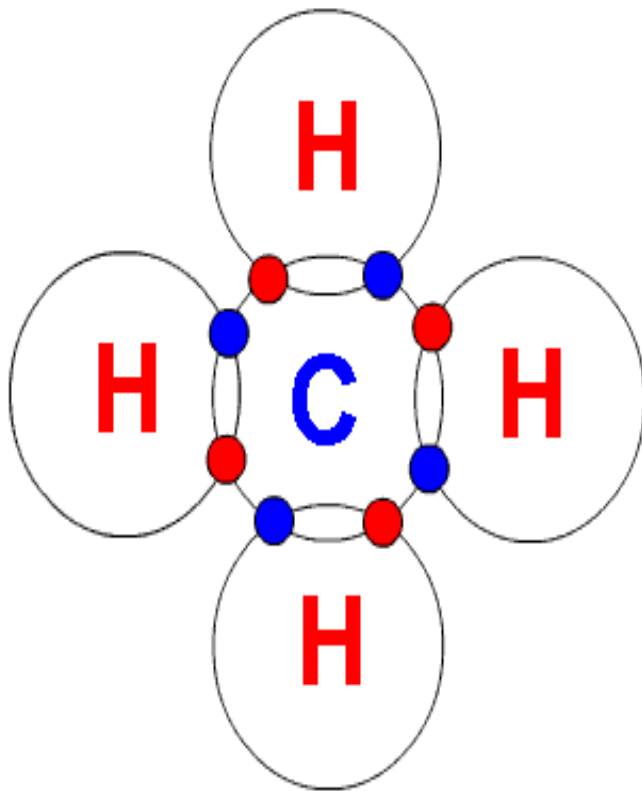


## CHAPTER 20

# Covalent Bonds

- What is an Covalent Bond?
  - A covalent bond is a chemical bond resulting from SHARING of electrons between 2 bonding atoms.
- What forms a covalent bond?
  - A covalent bond is formed between two nonmetals.

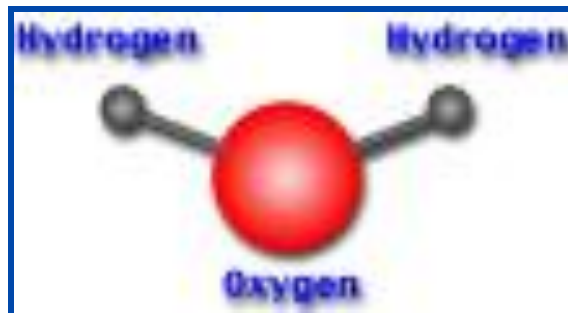
# What are some characteristics of a covalent bond?



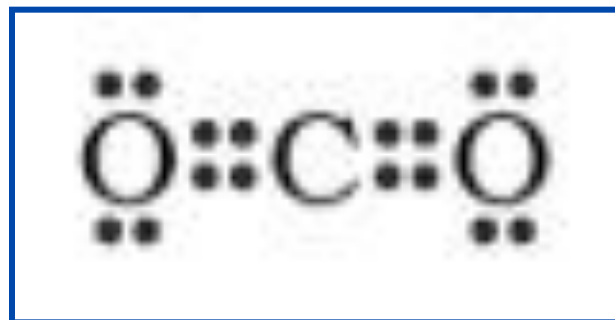
1. Covalent bonds have definite and predictable shapes.
2. Very strong
3. Low melting and boiling points

Covalent Bonds can have multiple bonds, so you should be familiar with the following...

Single Covalent Bond- chemical bond resulting from sharing of an electron pair (2 electrons) between two atoms.



Double Covalent Bond- sharing of two electron pairs (4 electrons) between two atoms.



Triple Covalent sharing of three electron pairs (6 electrons) between two atoms.

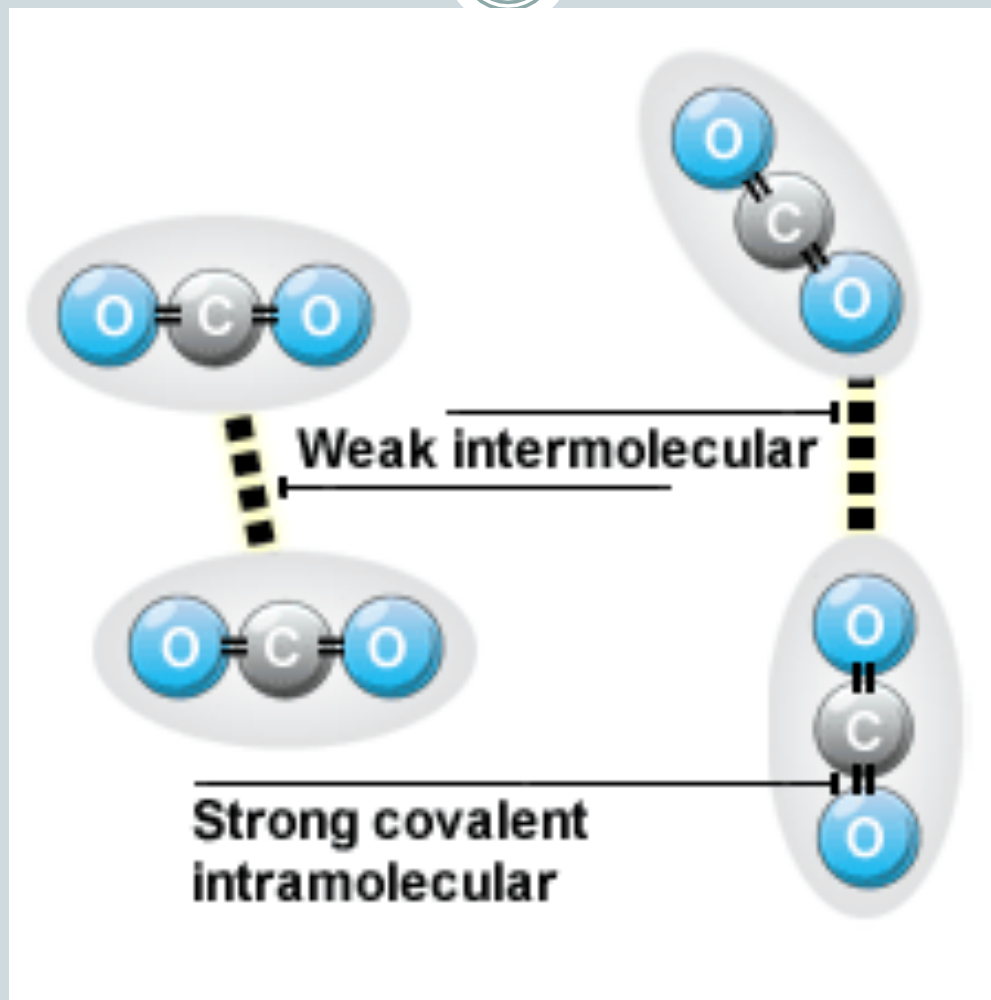


# Simple molecular structures

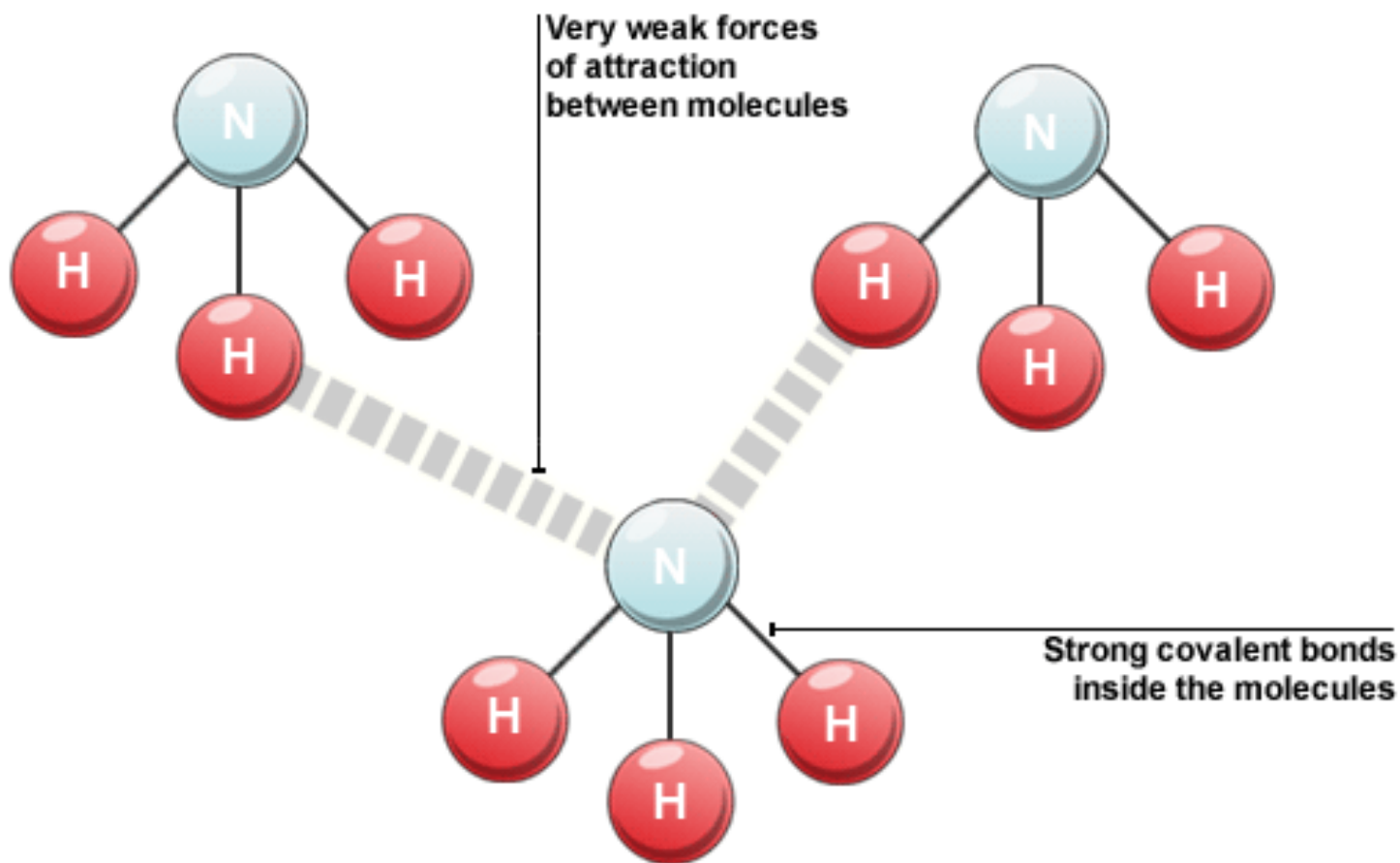


- They do not conduct electricity
- Low boiling/melting points
- Why?
  - Weak inter-molecular force holding the molecules together
- Remember during boiling and melting the bonds binding the atoms together don't break. These covalent bonds are **STRONG**.

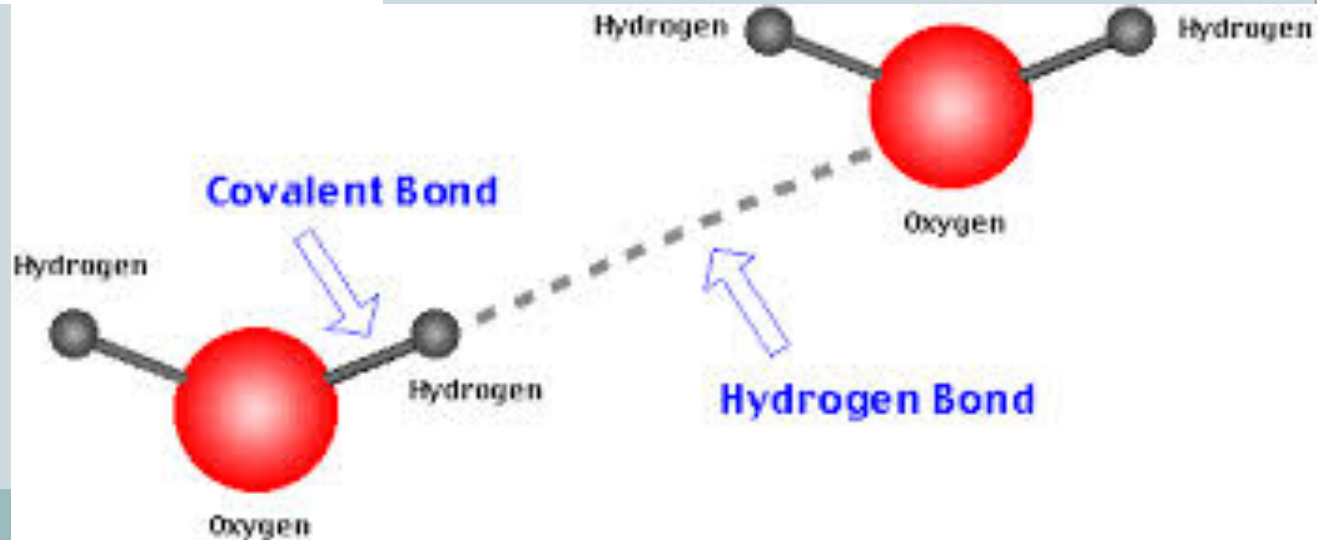
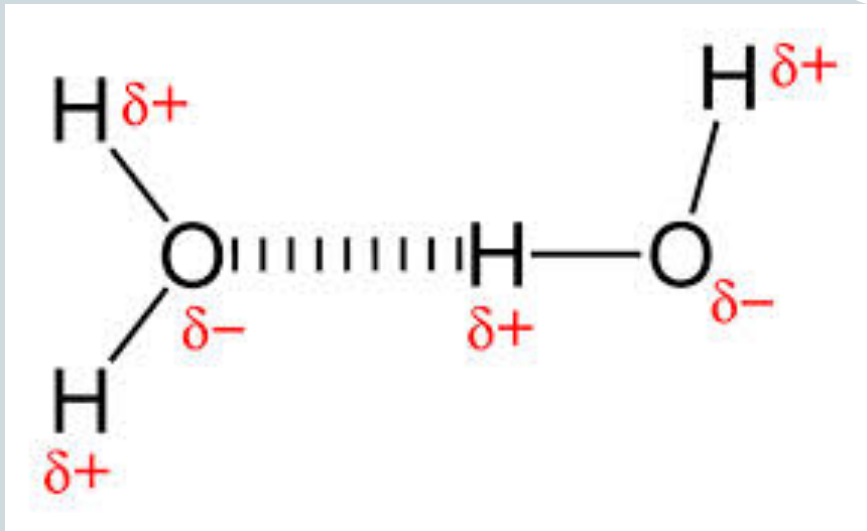
# Simple molecular structures



# Simple molecular structures



# Simple molecular structures



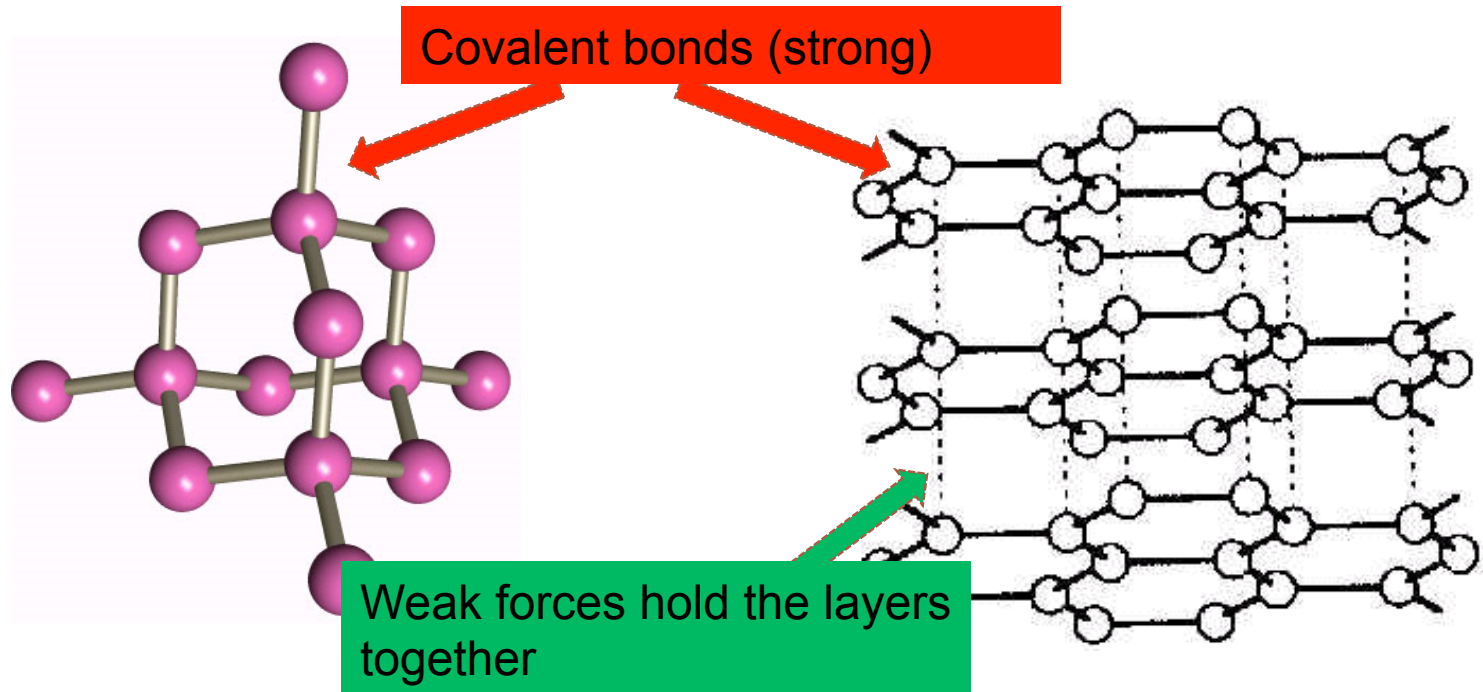
# Giant covalent structures



- Carbon can bond to millions of other carbons to form different giant structures.
- The different structural forms of an element are called **allotropes**
- Carbon has three allotropes, we will study two:
  - Diamond
  - graphite

# Diamond VS Graphite

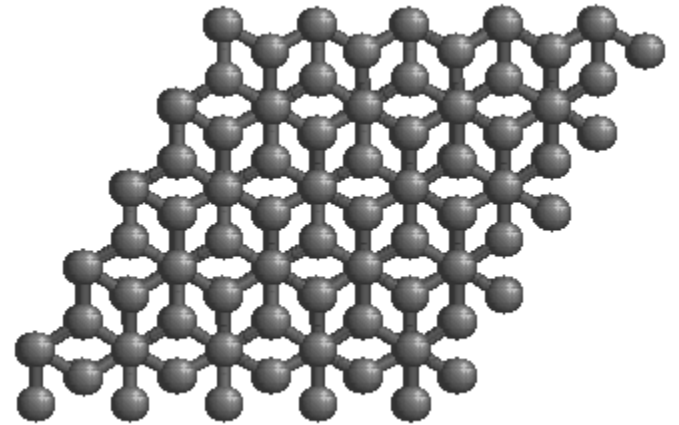
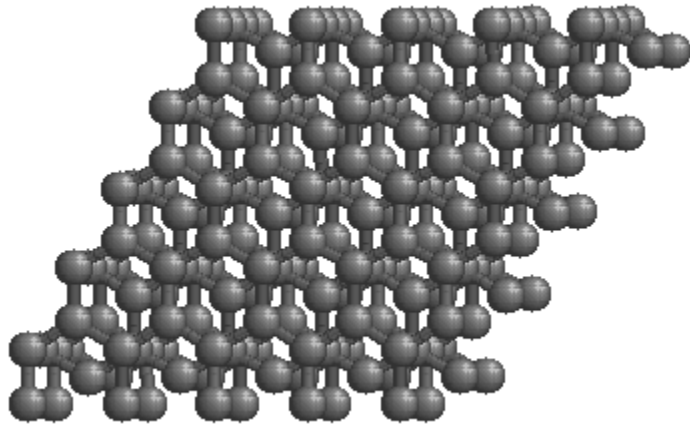
Both are made of carbon atoms. The difference is the arrangements of these carbon atoms.



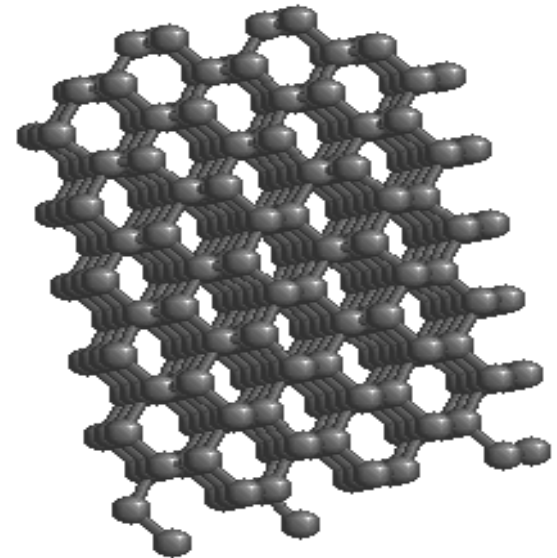
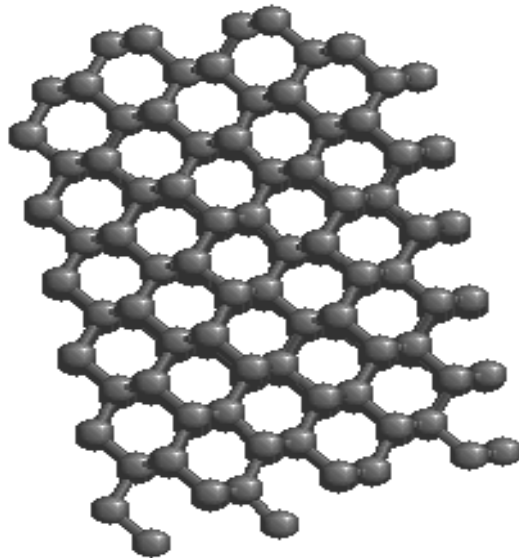
Diamond

Graphite

Graphite



Diamond



# Giant covalent structures



- Diamond is the hardest element
- Graphite:
  - smooth and slippery
  - 4<sup>th</sup> electron is in between the layers – we call these electrons “delocalized”
  - The movement of the delocalized electrons is what makes graphite a good conductor of electricity
  - It sublimes

# Diamond VS Graphite



	Diamond	Graphite
Electrical Conductivity	Bad	Good
Melting point	3700	3300
Number of bonds on each Carbon atom	4	3

# Giant covalent structures



- Have a high boiling/melting point
- Not soluble in water why?
- Read page 260-261

# Giant covalent structures



- Have a high boiling/melting point
- Not soluble in water why? **No charged so water doesn't attract to them**
- Read page 260-261